Create Clip Planes

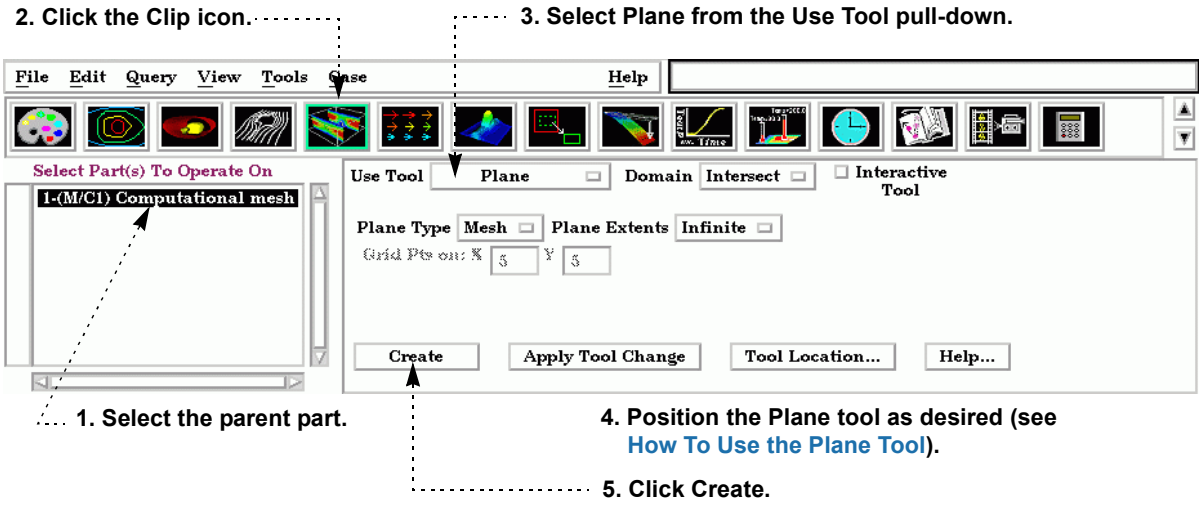
Introduction

A clipping plane is a planar slice through a 3D mesh. EnSight's clipping operation can take arbitrary cuts through either structured or unstructured meshes. The clip can be infinite in extent (at least to the bounds of the parts it is created from) or restricted to the bounds of the Plane tool. The nodes of the resulting clipping plane can be based on the topology and resolution of the underlying mesh or sampled on a regular grid.

Besides creating the intersection of a plane through a domain, which is the normal mode for clipping, a clipping plane can also be used to create parts which are what would result from a cut of its parent domain into "front" (inside) and or "back" (outside) parts. These parts contain valid elements of the same order as the original domain parts.

Like other clip tools, clipping planes can be interactively manipulated with the mouse providing a powerful volume visualization capability. Clipping planes can also be automatically animated to display results throughout a region of space or over time.

Basic Operation

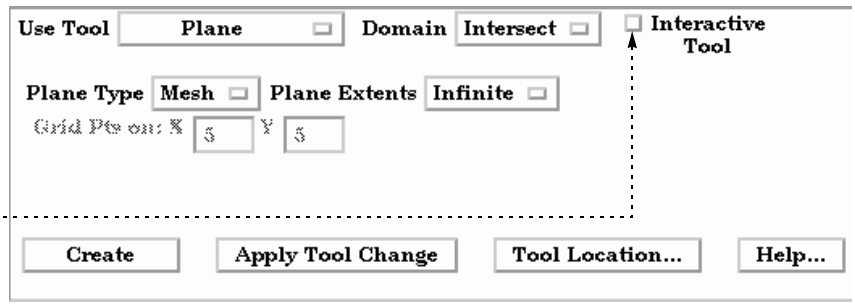


Advanced Usage

Interactive Clipping Planes

Like the other clipping tools in EnSight, intersection clip planes can be interactive: as you drag the Plane tool with the mouse, the clipping plane is automatically recalculated and redisplayed. To perform interactive plane clips:

1. Double-click the desired clip plane part in the parts list.
2. Toggle on Interactive Tool in the Quick Interaction area.



3. Move the mouse into the Graphics Window. Click on one of the Plane tool hotpoints (centerpoint or axis labels) and drag the tool to the desired location.

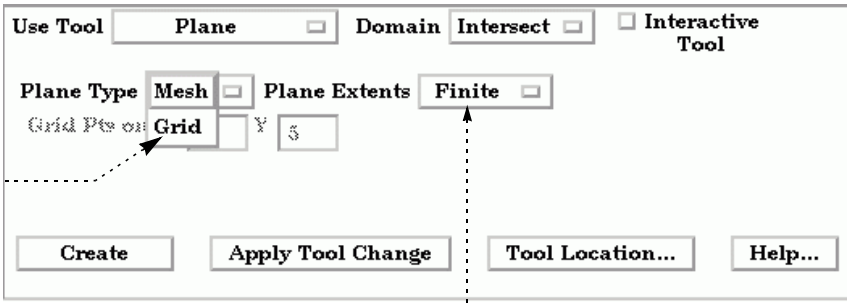
Grid Clips and Finite Clips

By default, clipping planes are calculated based on the resolution and topology of the underlying mesh (parent part(s)). Clipping planes can also be calculated using a regular sampling of the mesh. Such a clip is called a *grid clip* and is typically used for clipping unstructured meshes where element volumes vary widely. Creating vector arrows on a grid clip typically yields a more useful visualization than on a standard mesh clip.

By default, clipping planes extend to the bounds of the parent part. A clipping plane can also be restricted to the bounds of the Plane tool.

To change an existing clipping plane to a grid clip or to have finite extent:

1. **Double-click the desired clipping plane part in the parts list.**
2. **To change to a grid clip, select Grid from the Plane Type pull-down.**
3. **To change to a finite-extent clipping plane, select Finite from the Plane Extents pull-down.**



Clipping Plane Animation

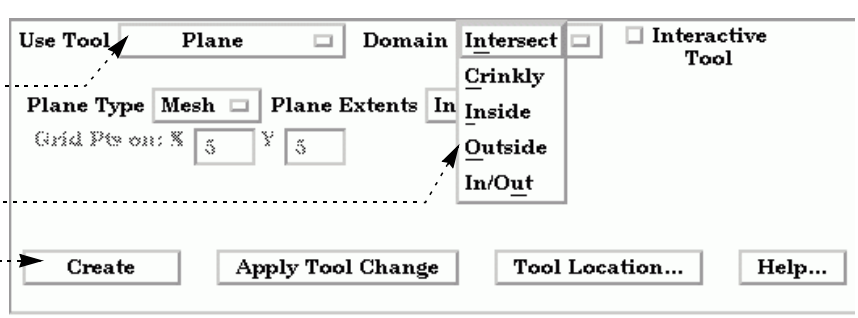
Although you can interactively sweep a clipping plane through a volume, it is sometimes desirable to have EnSight automatically calculate a series of clipping planes for you. These can then be replayed (as fast as your graphics hardware will permit) using EnSight's Flipbook Animation facility. The flipbook can animate a series of clipping planes using a starting and ending position for the Plane tool. You can also use the Keyframe Animation facility to animate clipping planes.

For a description of calculating a series of clipping planes with the Flipbook, see **How To Create a Flipbook Animation**. For more information on keyframing, see **How to Create a Keyframe Animation**.

Cutting with Planes

A plane can be used to create parts which are the result of a cut of its parent domain into "front" (inside) and or "back" (outside) parts. These parts contain valid elements of the same order as the original domain parts. Cutting can be used to slice away portions of a model that are not needed or to create animation effects such as "opening" closed regions to view the interior.

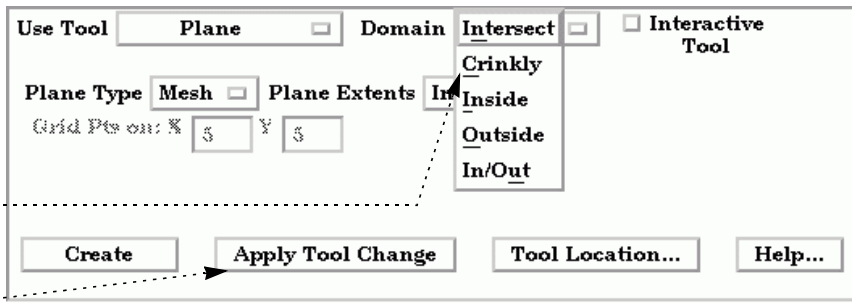
1. **Select the desired parent parts in the parts list.**
2. **Click the Clip feature icon.**
3. **Select the Plane Tool.**
4. **Set the Domain to Inside, Outside, or In/Out (both inside and outside).**
5. **Hit the Create button.**



Crinkly Plane Clips

You can also check the integrity of your mesh by clipping with a crinkly intersection. Specifying a Crinkly Domain results in a part composed of all the mesh elements that intersect the plane tool..

1. **Change the Domain to Crinkly.**
2. **Click the Apply Tool Change button.**



Other Notes

Use clipping planes to create planar clips through arbitrary meshes. If you have a structured mesh (such as those in PLOT3D format), you may wish to use IJK clips instead. An IJK clip displays a “plane” of constant I, J, or K. An interactive IJK clip will sweep through the range of (for example) I displaying the JK plane at each I value. See **How to Create IJK Clips** for more information.

See Also

Introduction to Part Creation
How To Use the Plane Tool
How To Create a Flipbook Animation.

Other clips:
How To Create Clip Lines
How To Create IJK Clips
How To Create Quadric Clips
How To Create XYZ Clips
How To Create RTZ Clips
How To Create Box Clips.

User Manual: **Clip Create/Update**